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DESCRIPTIONS OF NYMPHS OF THE PLANTHOPPER *HARMALIA ANACHARSIS* FENNAH, A SPECIES NEW TO THE UNITED STATES (HOMOPTERA: DELPHACIDAE)

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Abstract.—Adult male and female genitalia and first through fifth instar nymphs of the delphacid planthopper *Harmalia anacharsis* Fennah, collected from Amazon swordplant (*Echinodorus paniculatus* Micheli, Alismataceae) in southern Florida, are described and illustrated, and a key to instars is provided. Features useful in separating nymphal instars include differences in body size and proportions; spination of metatibiae, metatibial spurs, and metatarsomeres; and number of metatarsomeres.

The delphacid planthopper *Harmalia anacharsis* Fennah was first described from New Caledonia in the South Pacific (Fennah 1969). Since its initial description it has been found in Indonesia, the Philippine Islands, Sri Lanka and Vietnam (Wilson and Claridge, 1991). This delphacid has often been collected in rice fields but is not considered a pest, and may feed on some other host plant or plants (Claridge and Wilson, 1981; Holdom *et al.,* 1989). The adult brachypterous male of *H. anacharsis* was described, and the head and genitalia illustrated by Fennah (1969). Adults and nymphs of this delphacid were collected (by JHT) on Amazon swordplant (*Echinodorus paniculatus* Micheli, Alismataceae) in southern Florida. Adult males can be separated from other delphacids by the morphology of the external genitalia. At present, too little is known about delphacid nymphal morphology to allow comparisons among taxa. The present paper includes the first report of this species in the New World and detailed descriptions and illustrations of adult male and female genitalia, and first through fifth instar nymphs and a key for the separation of nymphal instars.

DESCRIPTION

Specimens used for description are housed in the Central Missouri State University insect collection and have the following collecting data: UNITED STATES: FLORIDA: Broward County, Fort Lauderdale, 11 April 1989, ex. Amazon swordplant (5 males, 10 females, 56 first instars, 27 second instars, 2 third instars, 4 fourth instars, 5 fifth instars).

The fifth instar is described in detail but only major differences are described for fourth through first instars. Arrangement and number of pits is provided for the fifth and fourth instars; this information is not given for earlier instars because the pits are extremely difficult to discern (those that could be observed relatively easily are

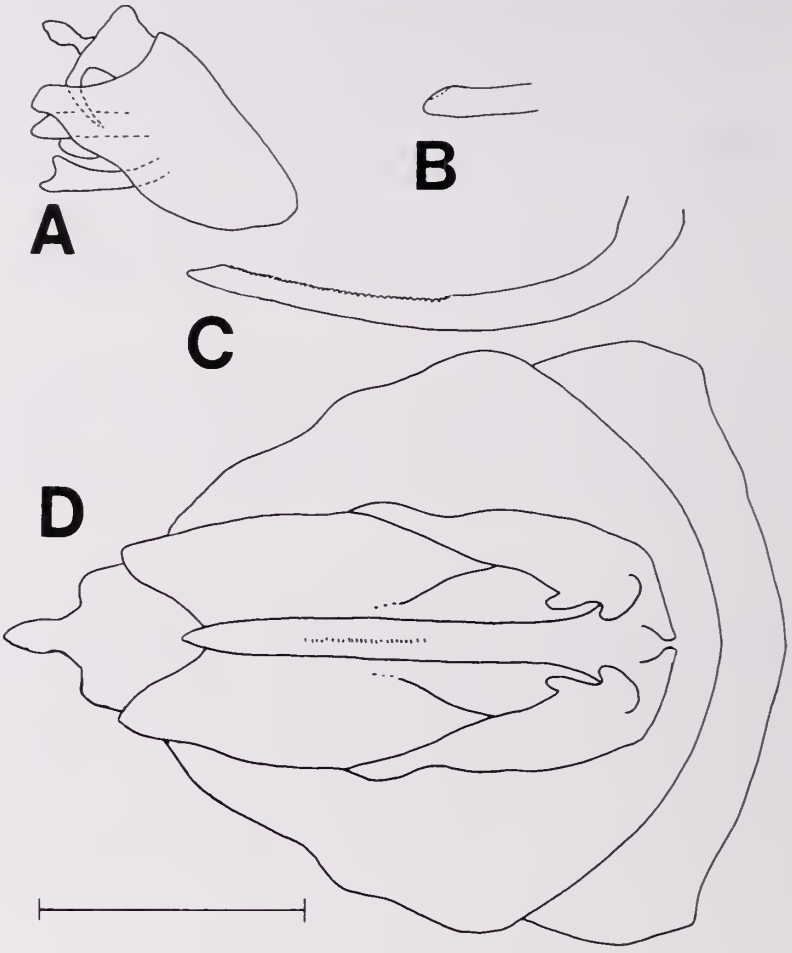

Fig. 1. *H. anacharsis* adult genitalia. A. Lateral view of male genitalia. B. Lateral view of aedeagus. C. Lateral view of ovipositor (median gonapophyses of segment 9). D. Ventral view of female genitalia. Bar = 0.5 mm.

illustrated). Measurements are given as mean ± SD. Length was measured from apex of vertex to apex of abdomen, width across the widest part of the body, and thoracic length along the midline from the anterior margin of the pronotum to the posterior margin of the metanotum.

Adults (Fig. 1A–D): Adults of *H. anacharsis* from Florida were found to be identical in all respects to specimens from Indonesia and the Philippine Islands with the following data: INDONESIA: WEST JAVA: Cikampek, January 1986, ex. rice, coll. D. Holdon (7 males) (S. W. Wilson Insect Collection); PHILIPPINE ISLANDS: LUZON ISLAND: GBTN Lightrap, February 1976 (1 male) (British Museum (Nat-

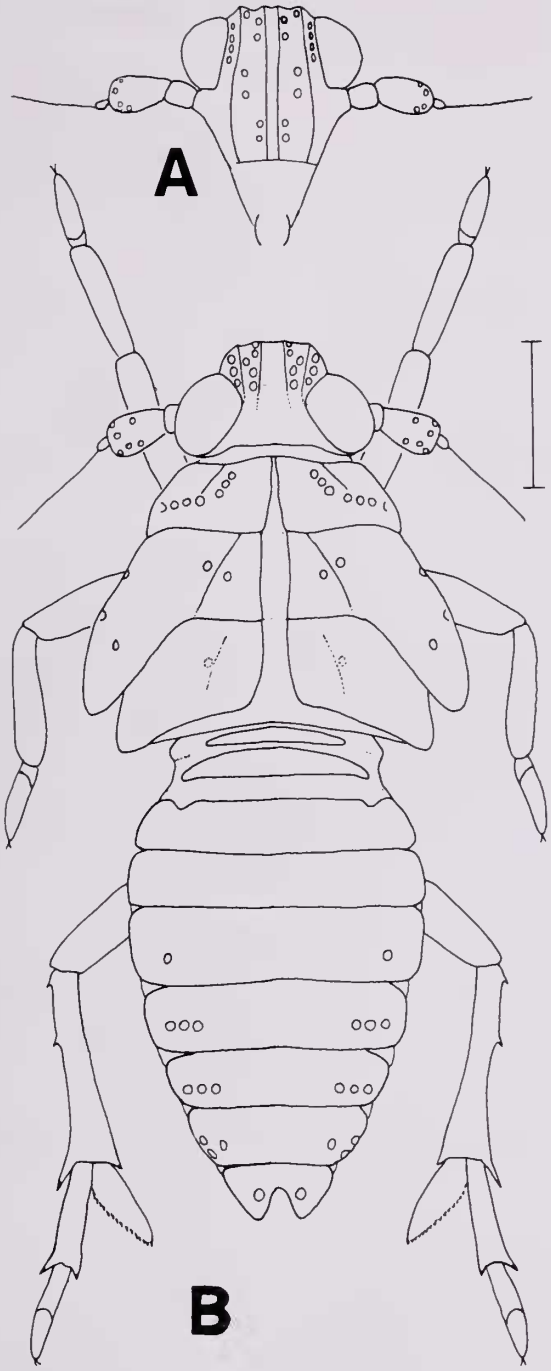

Fig. 2. *H. anacharsis* fifth instar nymph. A. Frontal view of head. B. Habitus, dorsal view. Bar = 0.5 mm.

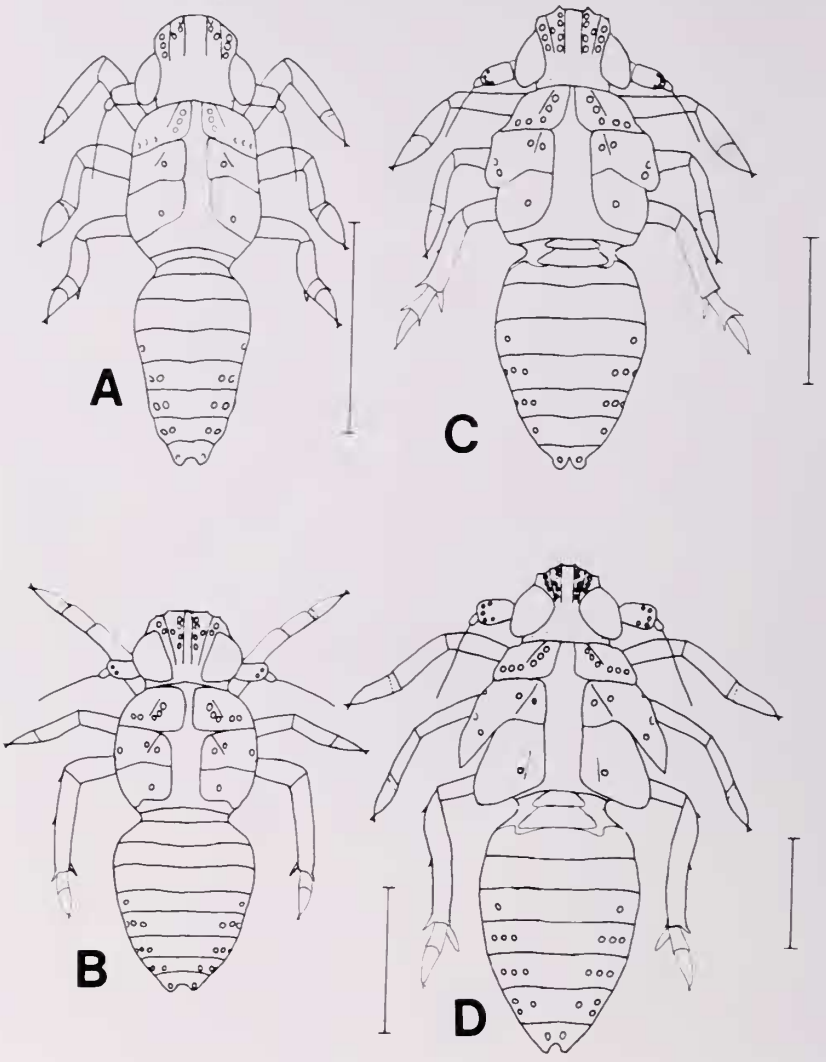

Fig. 3. *H. anacharsis* first through fourth instar nymphs. A. First instar. B. Second instar. C. Third instar. D. Fourth instar. Bars = 0.5 mm.

ural History)). Male genitalia were illustrated by Fennah (1969) and Wilson and Claridge (1991).

Male genitalia (Fig. 1A, B): Pygofer, in lateral view, subtriangular; in caudal view, diaphragm armature subtriangular. Anal tube with a pair of elongate ventrally directed spines originating on dorsocaudal aspect of the tube. Styles broadest across basal third (Wilson and Claridge, 1991, fig 3.109); with short, thumb-like projection bearing an elongate seta on median aspect near base; flaring slightly near apex, with

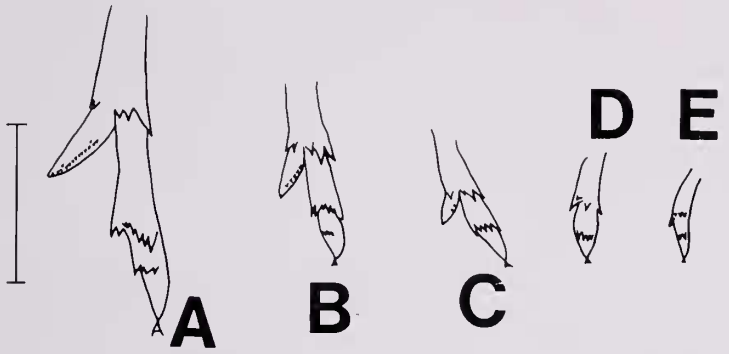

Fig. 4. *H. anacharsis* apices of metathoracic legs, plantar surface. A. Fifth instar. B. Fourth instar. C. Third instar. D. Second instar. E. First instar. Bar = 0.5 mm.

elongate thumb-like projection on median aspect. Aedeagus subcylindrical, with no ornamentation; gonopore subapical, dorsal.

Female genitalia (Fig. 1C, D): Terminology used in the description of the female genitalia follows Asche (1985) and Heady and Wilson (1990). Tergite nine oriented anteroventrally (see Asche 1985), elongate, longitudinally concave in ventral midline. Anal tube subcylindrical. Valvifers of segment eight each covering approximately one-third of tergite nine anterolaterally; with two lobe-like processes in anterior one-fourth on medial aspect. Lateral gonapophyses of segment nine elongate, broadly rounded posteriorly. In lateral view, median gonapophyses of segment nine saber-shaped, with approximately thirty-five shallow teeth on dorsal margin in distal one-half and four to five teeth present on posterior-most portion of ventral margin (not all teeth apparent in ventral view). Gonapophyses of segment eight slender, subacute apically.

Fifth instar (Figs. 2A, B; 4A): Length 3.3 ± 0.12; thoracic length 0.9 ± 0.10; thoracic width 1.2 ± 0.09; N = 5.

Form elongate, subcylindrical slightly flattened dorsoventrally. Widest across mesothoracic wing pads. Body whitish, infused with light brown (when preserved in alcohol); antennal segments and apices of tarsi darker brown.

Vertex subquadrate; length ca. 3× width at base; anterior one-half with two pairs of longitudinal carinae which extend onto frons. Frons with outwardly convex outer carinae forming lateral margins; paralleled by straight inner carinae; nine pits (seven visible in frontal view) between each inner and outer carina; four pits between each outer carina and eye. Clypeus narrows distally; basal postclypeus subconical, distal anteclypeus cylindrical. Beak extends to base of metatrochantors, three segmented; segment one obscured by anteclypeus; segment three slightly longer than segment two, apex black. Antennae three segmented; scape short, cylindrical; pedicel subcylindrical, 2× length of scape, with 10 sensoria; flagellum bulbous at base, one-fourth length of pedicel.

Thorax divided by a mid-dorsal line into three pairs of plates. Pronotal plates subrectangular; each plate with anterior margin slightly concave, posterolaterally directed carina and a row of seven pits paralleling the carina (lateralmost pits barely

visible in dorsal view). Mesonotum median length slightly longer than that of pronotum; wingpads extend from two-thirds the distance to apices of metanotal wingpads to the apices of the wingpads; each plate with a posterolaterally directed carina, one pit on either side of each carina, and three pits on lateral aspect of wingpad. Metanotum median length subequal to that of pronotum; wingpads extend to second tergite; weak carinae extend posterolaterally from near anterior margin; one weak pit lateral to carina. Pro- and mesocoxae elongate and directed posteromedially. Metacoxae fused to sternum. Metatibia with two spines on lateral aspect of shaft; transverse apical row of five black-tipped spines on plantar surface; moveable spur subtriangular, flattened, with one apical tooth and eleven to fifteen marginal teeth. Pro- and mesotarsi with two tarsomeres; tarsomere one wedge-shaped; tarsomere two subconical, with two apical claws and a membranous pulvillus. Metatarsi with three tarsomeres; tarsomere one with apical transverse row of seven black-tipped spines; tarsomere two with apical transverse row of four black tipped spines, ca. 0.5× length of tarsomere one; tarsomere three subequal in length to tarsomere two, with two apical claws and a membranous pulvillus.

Abdomen nine segmented; widest across fourth and fifth segments. Tergite one small, partially obscured by juncture of thorax and abdomen. Tergite two subtriangular; not extending to lateralmost aspect of segment. Tergites five through eight each with the following number of pits on either side: tergite five with one pit, six through eight each with three pits. Segment nine surrounding anus; three pits on each side; females with pair of processes extending posteriorly from juncture of tergites eight and nine; males lacking processes.

Fourth instar (Fig. 3D, 4B): Length 2.4 ± 0.08; thoracic length 0.8 ± 0.06; thoracic width 0.9 ± 0.05; N = 4.

Antennal pedicel with six sensoria; basal portion of antennal flagellum one-third length of pedicel.

Mesonotal wingpads shorter, covering up to one-half of metanotal wingpad laterally. Metatibial spur smaller, with one apical tooth and five to seven marginal teeth. Metatarsi with two tarsomeres; metatarsomere one with apical transverse row of six black-tipped spines; metatarsomere two with three black-tipped spines in middle of tarsomere.

Third instar (Figs. 3C, 4C): Length 1.6 ± 0.01; thoracic length 0.6 ± 0.04; thoracic width 0.6 ± 0.03; N = 2.

Antennal pedicel with four sensoria; length of base of antennal flagellum 0.5× that of pedicel.

Mesonotal wingpads shorter, barely extending onto metanotal wingpads. Metatibial spur smaller, with one apical tooth and one to two marginal teeth. Metatarsomere one with apical transverse row of five black-tipped spines.

Second instar (Figs. 3B, 4D): Length 1.3 ± 0.03; thoracic length 0.5 ± 0.03; thoracic width 0.4 ± 0.02 N = 10.

Antennal pedicel with two sensoria.

Mesonotal length subequal to that of pronotum; wingpads undeveloped. Metatibia with apical row of three spines; spur with one apical tooth and no marginal teeth, ca. 3× longer than longest metatibial spine. Metatarsomere one with four apical black-tipped spines.

First instar (Figs. 3A, 4E): Length 1.0 ± 0.04; thoracic length 0.4 ± 0.02; thoracic width 0.3 ± 0.02 N = 10.

Antennal pedicel lacking sensoria.

Metatibia lacking lateral spines on shaft; spur smaller, ca. 1.5× longer than longest metatibial spine.

Abdominal tergites six through eight each with two lateral pits on either side.

KEY TO *H. ANACHARSIS* NYMPHAL INSTARS

1. Metatibial spur with five or more marginal teeth (Figs. 4A, B); mesonotal wingpads extending to half length of metanotal wingpads (Figs. 2B, 3D) 2
   Metatibial spur with fewer than five marginal teeth (Figs. 4C–E); mesonotal wingpads not extending beyond half length of metanotal wingpads (Figs. 3A–C) 3
2. Metatarsi with three tarsomeres; metatibial spur with more than ten marginal teeth (Fig. 4A) ..... 5th instar
   Metatarsi with two tarsomeres; metatibial spur with fewer than eight marginal teeth (Figs. 4B–E) ..... 4th instar
3. Metatibia with transverse row of five apical spines; spur with one to two marginal teeth (Fig. 4C) ..... 3rd instar
   Metatibia with transverse row of three apical spines; spur lacking marginal teeth (Figs. 4D, E) 4
4. Metatibia with two lateral spines on shaft; spur more than 2× length of longest apical spine (Fig. 4D) ..... 2nd instar
   Metatibia without lateral spines on shaft; spur less than 2× length of longest apical spine (Fig. 4E) ..... 1st instar

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